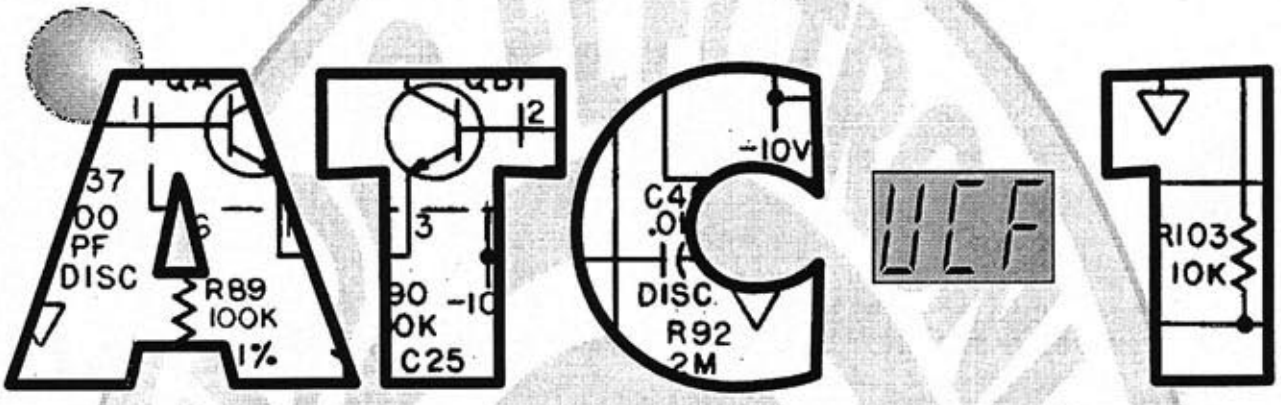
TYPE: MINI

TYPE: 303



TONE CHAMELEON

INSTRUCTION MANUAL

By: Greg St. Regis • Marc St. Regis • Daniel Wendell

TYPE: 2600

TYPE: S.E.M.

IMPORTANT SAFETY INSTRUCTIONS

WARNING - When using electric products, basic precautions should always be followed, including:

1. Read all of the instructions before using product.
2. Do not use product near **any** water source.
3. This product, either alone or in combination with an amplifier and headphones or speakers, may be capable of producing sound levels that could cause permanent hearing loss. Do not operate for a long period of time at high volume level or at a level that is uncomfortable. If you experience any hearing loss or ringing in the ears, you should consult an Audiologist.
4. The product should be located so that its location or position does not interfere with its proper ventilation.
5. The product should be located away from heat sources such as radiators, heat registers, or other products that produce heat.
6. Avoid using the product where it may be affected by dust.
7. The product should be connected to a power-supply only of the type described in the operating instructions or as marked on the product.
8. The power-supply cord of the product should be unplugged from the outlet when left unused for a long period of time.
9. Do not trample on the power-supply cord.
10. Do not pull the cord, but grasp the plug when unplugging.
11. Care should be taken so that objects do not fall and liquid is not spilled into the enclosure through openings.
12. The product should be serviced by qualified service personnel when:
    - A. The power-supply cord or the plug has been damaged.
    - B. Solid objects or liquid either have fallen or spilled into the product.
    - C. The product has been exposed to rain.
    - D. The product does not appear to operate normally or exhibits a marked change in performance.
    - E. The product has been dropped, or the enclosure damaged.
13. Do not attempt to service the product beyond that described in the user maintenance instructions. All other servicing should be referred to qualified technicians.

SAVE THESE INSTRUCTIONS

CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN
ATTENTION: RISQUE DE CHOC ELECTRIQUE NE PAS OUVRIR
CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK DO NOT REMOVE COVER, OR BACK. NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

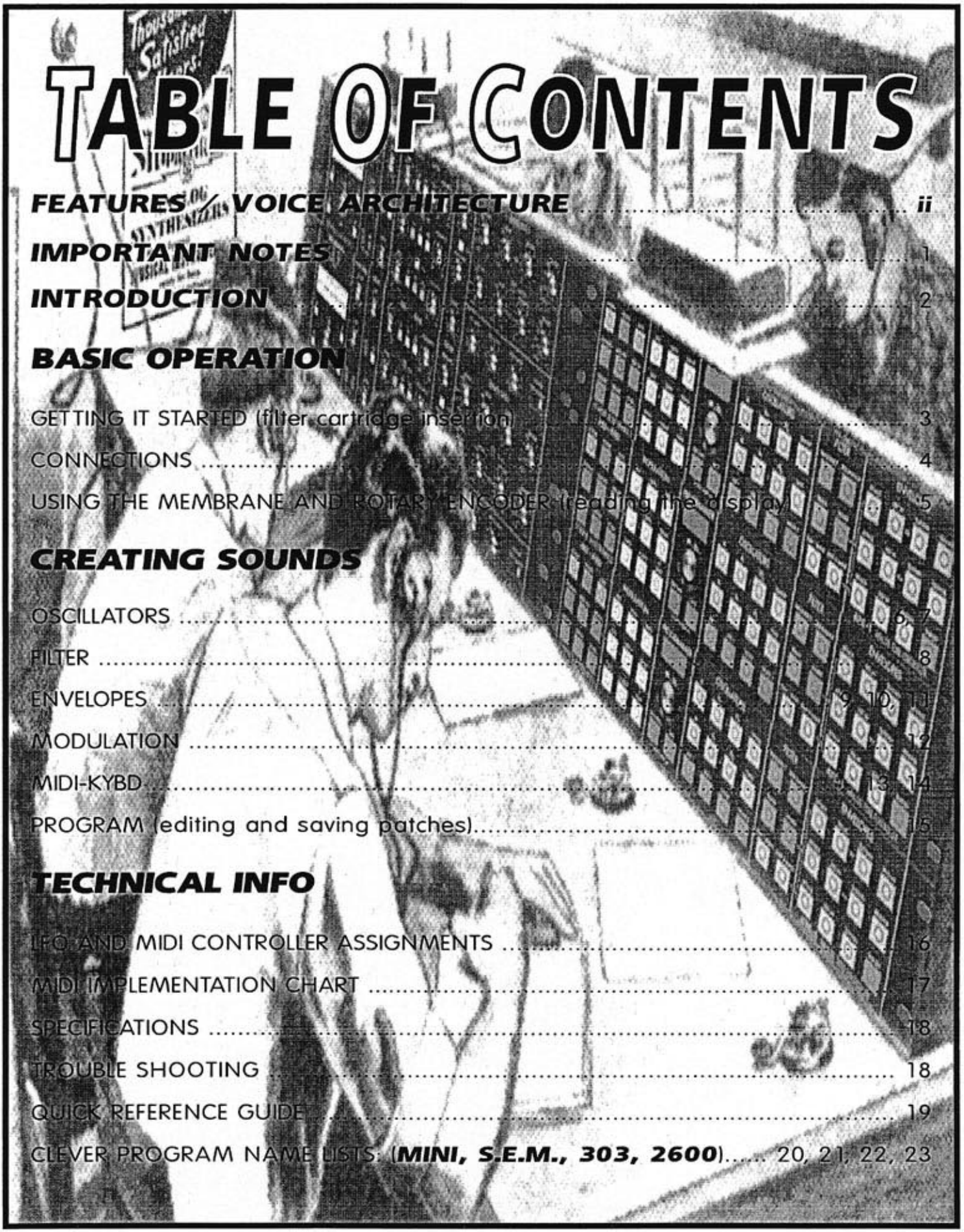
The lightening flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltages" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

GROUNDING INSTRUCTIONS

This product must be grounded. If it should malfunction or break down, grounding provides a path of least resistance for electric current to reduce the risk of electric shock. This product is equipped with a cord having an equipment grounding conductor and a grounding plug, which must be plugged into an appropriate outlet that is properly installed and grounded in accordance with all local codes and ordinances.

DANGER - Improper connection of the equipment grounding conductor can result in a risk of electric shock. Check with a qualified electrician or serviceman if you are in doubt as to whether the product is properly grounded. Do not modify the plug provided with the product. If it will not fit the outlet, have a proper outlet installed by a qualified electrician.



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FEATURES

1. Portamento and auto glide.
2. Single and multiple triggering.
3. Inverting of envelopes 1 and 3.
4. Note priority: low or last.
5. LFO 2 sync to MIDI clock with seven beat divisions: whole, half, quarter, quarter note triplet, eighth, eighth note triplet, sixteenth, and sixteenth note triplet.
6. Assignable additional envelope.
7. Audio frequency modulation of Oscillator 1 and filter by Oscillator 2.
8. Individual continuous controller assignments for all key sound parameters.
9. Patch parameter edits from rotary encoder transmitted via MIDI.
10. Velocity sensitive.
11. Extensive Mod Wheel and Aftertouch assignments.
12. Holds 512 patches in RAM.
13. External input for audio signal processing.
14. CV and GATE in and out. (CV and Gate in to be implemented with software version 2.0, due for release 1/97.)

VOICE ARCHITECTURE

Hardware

A. Two voltage controlled oscillators with triangle, sawtooth, and square waveforms. The square waveform has variable pulse width control.

B. User selectable voltage controlled filters. (Interchangeable Cartridge Filter System).
"Types" available:
MINI: Reproduction of the classic 24db MiniMoog low pass resonant filter.
S.E.M.: Reproduction of the original 12db Oberheim Synthesizer Expander Module filter.
303: Reproduction of the Techno classic Roland TB-303 filter.
2600: Reproduction of the unique and rare ARP 2600 filter.

C. White noise generator.

D. High dynamic gain voltage controlled amplifier.

Software

A. Three four-stage envelopes with specially designed exponential curves. Attack, decay, sustain, and release controls. Time range: 1 m.sec - 15 sec.

B. Two low frequency oscillators with triangle, square, saw up, saw down, noise, and random waveforms. Frequency range: 0.1 hz - 50 hz

IMPORTANT NOTES

In addition to the aforementioned "Safety Instructions" printed on the inside front cover, we the good folks at S. E. ask that you **please** read and adhere to the following suggestions.

POWER SUPPLY CONCERNS

- Turn off the power to all equipment before making any connections between devices. This will help to prevent malfunction and speaker damage.
- Be certain to use a separate power outlet for this unit; as sharing one with distortion producing devices (such as motors, variable lighting devices) is unwise.

PLACEMENT CONCERNS

- Placing the unit in close proximity to power amplifiers or equipment containing large transformers is likely to induce hum.
- If the unit is to be operated nearby T.V. or radio receivers, some type of interference might be noticeable. In such cases, move the unit out of proximity with the entertainment devices.

MAINTENANCE

- In hopes that you might keep the visuals of your treasured analog gem in tip top shape, our cleaning specialists recommend wiping ever so gently with a slightly dampened soft cloth. For those stains of a more tenacious temprement add a mild detergent to the mix; always remembering to follow with that ubiquitious "soft dry cloth".
- Never apply solvents of any kind - benzene, paint thinner, propyl alcohol, etc., - to avoid the risk of nasty discoloration, disfigurement ***a n d most importantly*** those deadly liver flukes. *(It should be parenthetically noted that neither solvents nor the unit itself are ever to be taken internally!)*

OTHER PRECAUTIONS

- Protect the unit from strong jolts and vibration. Especially when standing on well established fault lines.
- Never apply strong pressure to the front, back or side panels, or strike them in any manner whatsoever. Yelling, however, is certainly permissible and quite cathartic.
- It is normal for this synthesizer to generate a certain degree of heat.

MEMORY BACKUP CONCERNS

- Within the unit is contained a battery which serves to maintain the contents of the memory when the power is switched off. The normal life of this battery is 5 years or more. To prevent unintentional memory loss, we advise that you replace the battery every 5 years as a rule. When it is time to change it, contact us or your local authorized Studio Electronics service station.
- Please be aware that the contents of the memory may possibly be lost: when sent for repair work, or when a chance malfunction occurs. It is always prudent to back up your complete memory via a SYSEX bulk dump; remember that each bank must be saved individually. When in the shop for repair, great care is taken to avoid data loss, however In the event of damage to circuitry related to the memory system itself, you are sorry for Charlie.

INTRODUCTION

Thank you for purchasing the **STUDIO ELECTRONICS ATC-1**. You're soon to discover the world's only interchangeable cartridge filter system. Like never before, you now have the ability to create and explore all of the classic Analog synthesizer sounds in one powerfully expressive and versatile machine.

The **ATC-1** is a truly modern Analog synthesizer, incorporating authentic discrete componnent circuitry with complete MIDI implementation and total programmability. Control of the parameters from the optical encoder is smooth and precise. It's creative and intuitive design incorporates unique features and functions, allowing the discerning muscian complex tone manipulation and seemingly infinite patch variations.

The electronically produced sound of the **ATC-1** is vibrant, warm and "punchy"; possessing the highly pleasing qualities of inherent randomness in pitch and timbre, like those of a fine acoustic instrument.

We take great pride in manufacturing this instrument in "the land that the rivers have quartered", The United States of America; and maintain the highest standards of quality by meticulously procuring only the finest materials and carefully assembling each and every **STUDIO ELECTRONICS** product by hand.

It is our sincerest hope that the long anticipated **ATC-1** surpasses your expectations and provides many hours of satisfaction and pleasure.

INTRODUCTION

INTRODUCTION

INTRODUCTION

GETTING IT STARTED

Setting Up The Instrument

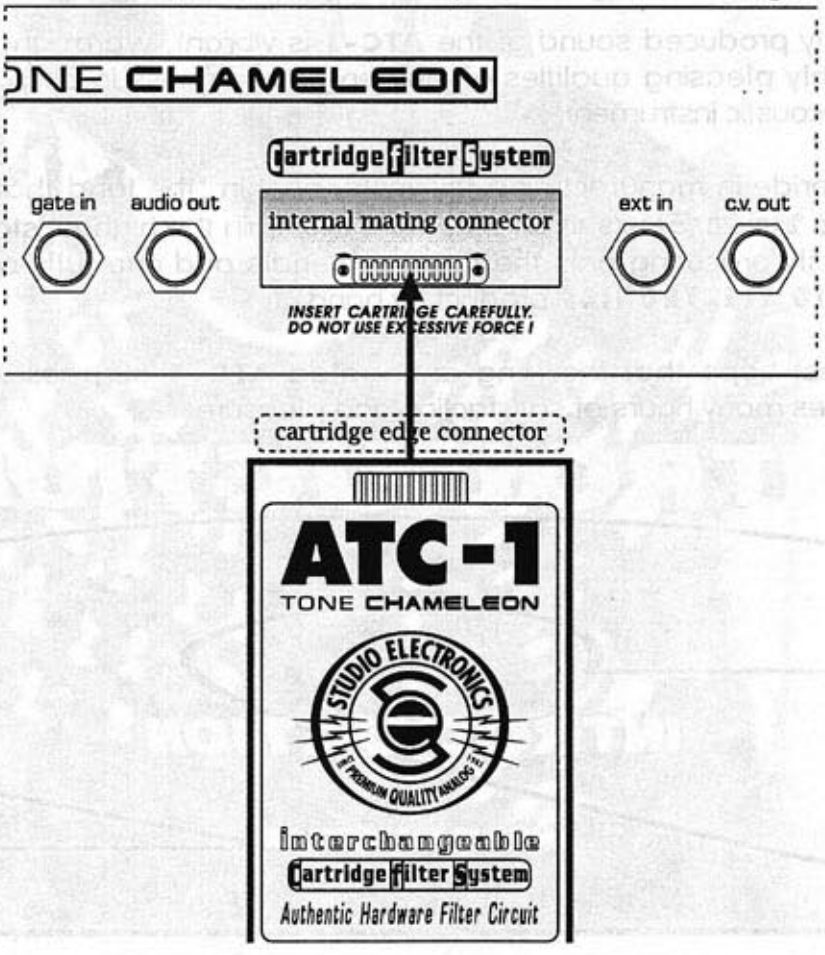
A. Plug the power supply cable into any conventional A.C. outlet. With it's auto-switching power supply the **ATC-1** is capable of accommodating voltages ranging from 90 - 250. So, wherever you and your **ATC-1** are in this great big world, proper operation is a cinch.

B. Use an appropriate patch-chord to connect the **ATC-1** to your sound monitoring devices. To reproduce the full sound spectrum of which the synthesizer is capable, a "high fidelity" P.A. system is required.

C. Flip the power switch on the back of the unit to the on position. Allow approximately 3 to 5 minutes for proper warm-up to assure tuning stabilization.

Filter Cartridge Insertion

In order to produce sound, you must, first, insert one of the **ATC-1's** filter cartridges into the "Cartridge Filter System" slot at the back of the unit in the following manner: Turn power off (although inserting the filter cartridges while the power is on should cause no damage, we do not recommend it), place cartridge in slot with it's edge connector facing the back of the unit and push with moderate pressure. When you feel the cartridge's edge connector fit snugly into the **ATC-1's** internal mating connector, you are now ready to rock... and we salute you.

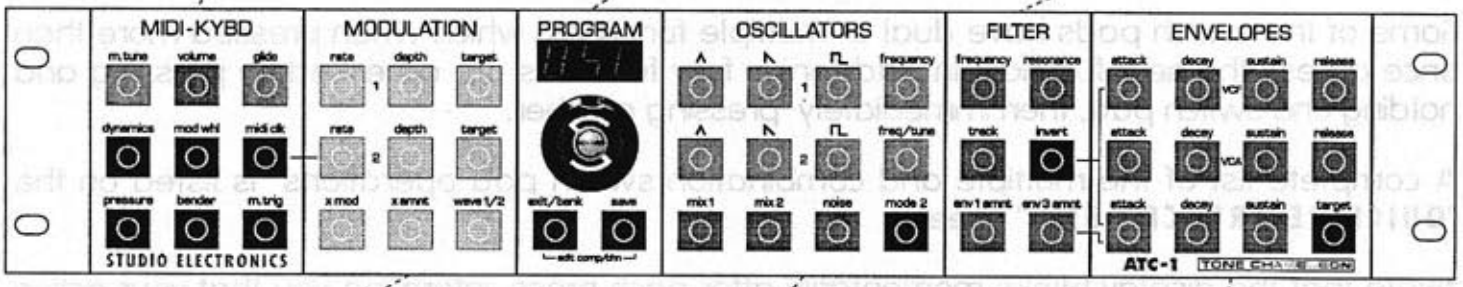


FRONT AND BACK PANEL

MIDI - KEYBOARD:
MIDI performance assignments, keyboard control, main volume, master tuning. *(See page 13 for complete instructions.)*

PROGRAM:
Unit display, optical rotary encoder, memory management functions. *(See page 14 for complete instructions.)*

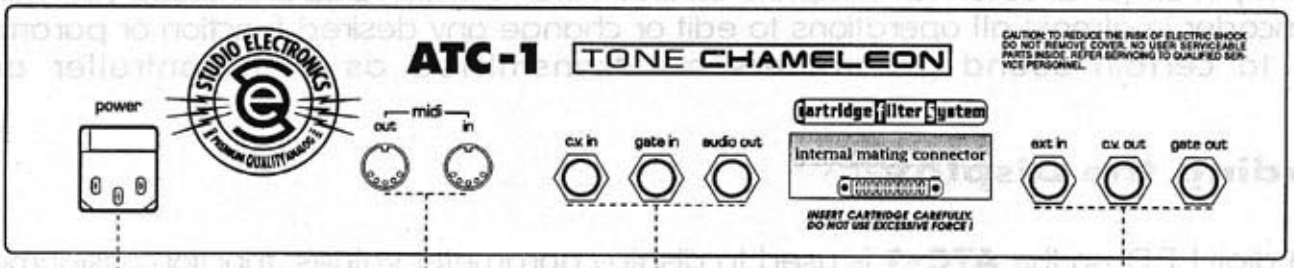
FILTER:
Tone controls for all cartridge filter selections, envelope amounts and modes. *(See page 8 for complete instructions.)*



MODULATION:
Low frequency modulation, audio frequency modulation. *(See page 12 for complete instructions and free low sodium candy.)*

OSCILLATORS:
Waveform selection, oscillator tuning / level control, pulse width determination, pulse width. *(See pgs. 6 & 7 for comp. instructions.)*

ENVELOPES:
Time and level controls for envelopes 1, 2, & 3, target assignment for envelope 3. *(See pages 9 & 10 for complete instructions.)*



POWER:
Connect the power supply cable to this receptacle.

MIDI *connectors* [IN,OUT]:
Connect MIDI devices to these input and output jacks.
IN: This connector receives MIDI messages, allowing external MIDI devices such as a keyboard controller or sequencer to control the ATC-1.
OUT: This connector transmits MIDI messages. The ***ATC-1*** uses this output to transmit System Exclusive Messages (patch and bank dump).

C.V. IN: 1 volt per octave control voltage input. (See C.V. OUT for novel ideas.)

GATE IN: A standard V-trigger input. (See GATE OUT for fun suggestions.)

AUDIO OUT: Connect this output to the input of an amplifier or mixer. To take full advantage of the high sound quality of the **ATC-1**, use amps, effects units, and speakers with a wide frequency response and dynamic range.

The **ATC-1** will produce the widest dynamic range when the volume is at maximum. Leave the volume as high as possible and adjust the sound level from the mixer or amplifier.

cartridge edge connector

EXT IN: Any sort of high impedance microphone signal or sound source may be fed into this input; this includes guitars, keyboards, "vocal - mic", tape recorder outputs, radio signals, etc.; which are then routed to the ***ATC-1's*** filter and voltage controlled amplifier for timbre modulation processing.
C.V. OUT: 1 volt per octave control voltage output for use with older Analog synthesizers and sequencers.
GATE OUT: A standard V-trigger output for triggering older Analog synthesizers and sequencers.

FILTER CARTRIDGE:
Houses individual "authentic voltage controlled" filter circuit.

(See page 3 for complete instructions on cartridge installation, removal, and care.)

USING THE MEMBRANE AND ROTARY ENCODER

The Membrane

The front panel membrane of the **ATC-1** contains an array of switches, with each colored pad located atop a single switch. To access any function or parameter, simply press wit light to moderate force on the desired switch pad.

Some of the switch pads have dual or multiple functions; which when pressed more than once access the next function. In addition, a few functions are accessed by pressing and holding one switch pad, then immediately pressing another.

A complete list of the multiple and combination switch pad operations is listed on the "**QUICK REFERENCE GUIDE**" sheet.

*Note that the display blinks momentarily after each press, informing you that your action has been recognized.

The Rotary Encoder

The main user interface in programming the **ATC-1** is the rotary encoder; which turns smoothly in either direction for complete control. After a switch pad is pressed you will use the encoder in almost all operations to edit or change any desired function or parameter. Edits to certain sound parameters are transmitted as MIDI controller data.

Reading the Display

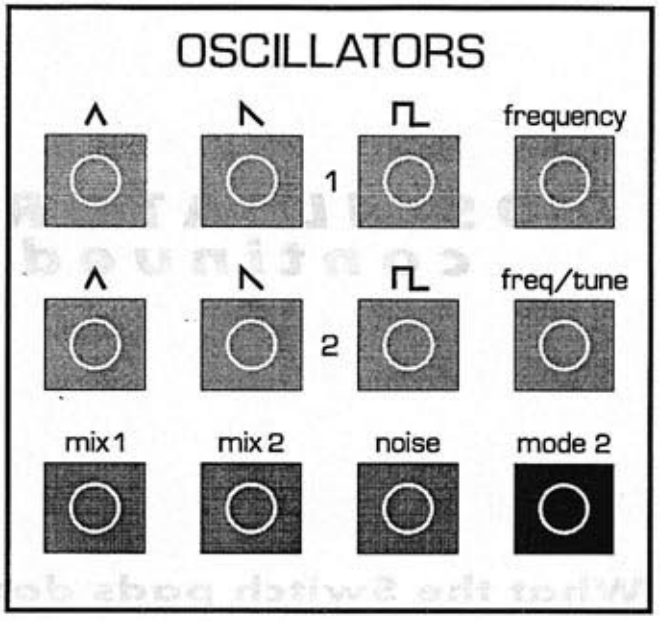
The 3 digit L.E.D. on the **ATC-1** is used to display parameter values, function assignments, and all operations in an alphanumerical format. Abbreviations are used for most of the function assignments; refer to the "***MASTER SYMBOL KEY***" on the "**QUICK REFERENCE**

*Note that the display blinks momentarily after each press, informing you that your action

OSCILLATORS

The oscillators are the unmodified building blocks of Analog synthesis. An oscillator produces periodic or regularly repeating waveforms, i.e. pitched sounds. The tuning controls alter the frequency or pitch of the oscillators. The waveshape selectors determine the harmonic spectrum of the signal, its basic timbre, or tone color.

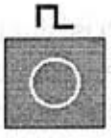
The **ATC-1** has two oscillators that each produce three waveforms. All the waveforms are continuously being generated, so they are available to be outputted either individually or simultaneously, depending upon how they are selected.



What the Switch pads do:

Selects the **triangle** waveform. Press once to display current patch setting then press again to turn on or off. Triangle shaped waveforms produce smooth flute-like tones. (Same for both oscillators.)

Selects the **sawtooth** waveform. Press once to display current patch setting then press again to turn on or off. Sawtooth shaped waveforms produce punchy brass-like tones. (Same for both oscillators.)



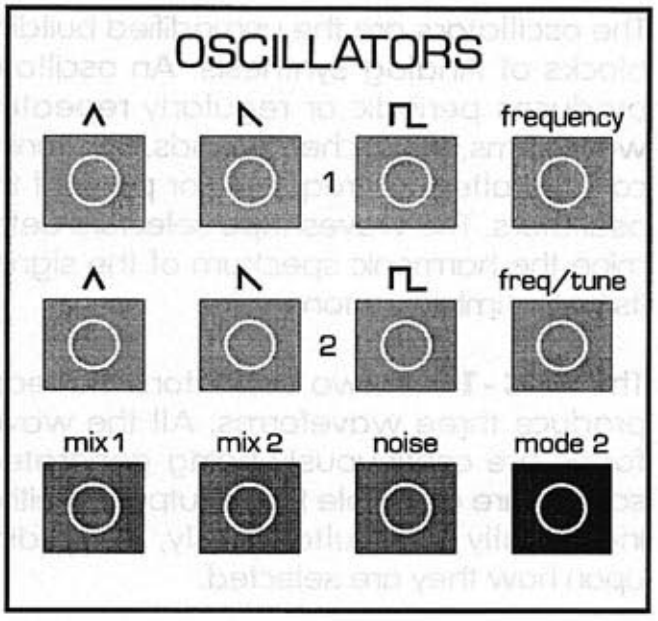
Selects the **square** waveform. Pressing will display the current pulse width setting, use the encoder to edit. A true square wave will be obtained by setting the pulse width at **60**. Square shaped waveforms produce bright reed-like tones. (Same for both oscillators.)

Selects Oscillator 1 coarse-tuning. Provides continuous tuning of Oscillator 1; raises or lowers the pitch in half-step increments. **0** is the lowest tuning, with multiples of 12 being the octave intervals.

Selects Oscillator 2 tuning. Pressing once will select coarse tuning - pressing again will select the fine tuning. Continuous presses will toggle between coarse and fine. Slightly detuning Oscillator 2 will add warmth and depth to the sound.

OSCILLATORS (continued on next page.)

OSCILLATORS continued



What the Switch pads do:

mix 1

Selects the mix level of Oscillator 1. As the level is increased beyond **100** some harmonic distortion may occur; which is quite normal depending upon how many waveforms are selected and the settings of the filter.

mix 2

Selects the mix level of Oscillator 2. (Same potential for harmonic distortion as Oscillator 1.)

noise

Selects the mix level of the noise source. Noise is a random signal, a rushing, static-like sound. The **ATC-1**'s noise generator produces white noise. White noise is composed of all frequencies in equal amounts. Note: The noise may not be audible if the filter frequency is set too low.

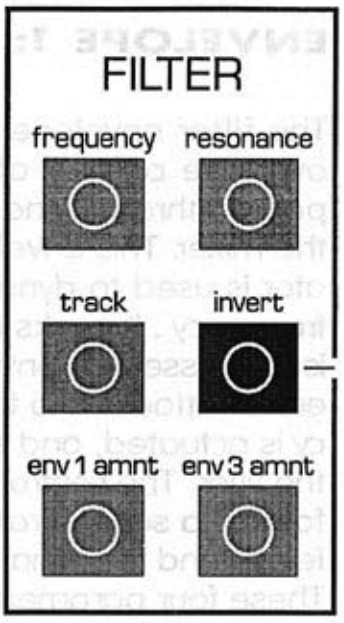
mode 2

Selects the different pitch modes of Oscillator 2. The modes are as follows:

0 - normal operation
1 - Oscillator 2 is synced* to Oscillator 1
2 - No control voltage to Oscillator 2. (Pitch does not track keyboard.)
3 - No control voltage to Oscillator 2 and it is synced to Oscillator 1

*Forces the pitch of Oscillator 2 to follow the pitch of Oscillator 1 in hard synchronization so it will therefore tune only to harmonic frequencies of Oscillator 1. Intermediate frequencies of Oscillator 2 will produce unusual wave shapes and timbres.

FILTER



The **ATC - 1** with its unique ***interchangeable filter system*** features four classic wide range lowpass filters, and in the case of the **MINI** and **2600,** "resonant" filters. (See ***VOICE ARCHITECTURE***.) The Filter attenuates, or "cuts-off" the higher frequency components those which lie above the adjustable cutoff frequency, and passes the lower frequency components of the audio signal. The (cutoff) **frequency** control control sets this cutoff frequency; the lower the value of the (cutoff) **frequency** control, the less harmonic content the waveform contains after passing through the filter. The wave shape is rounded and smoothed as the cutoff frequency is lowered.

What the Switch pads do:

frequency

Selects the filter (cutoff) frequency. In simpler terms, the filter frequency is like an overall tone control; as the value is increased from **0 - 127**, the higher the frequencies are which pass through the filter. Thus, the brighter the sound.

resonance

Selects the filter resonance. The resonance empasizes the cutoff frequency region and makes the presence of harmonics more apparent. The **MINI** and **2600**, and **303** filters will begin to self-oscillate, and may be used as a separate tone source, when the resonance value passes approximately **100**.
(The ***S.E.M.****, due to its original design, is, sadly, only at the threshold.)*

track

Selects the filter tracking amount. Filter tracking applies keyboard control voltage to the filter. As more tracking is used, the brighter the sound will get as you ascend the keyboard.

invert

Selects the **inverting** of envelopes 1 (filter) and / or 3 (assignable). When an envelope is inverted, the attack & decay controls are reversed, and the sustain value inverts. The **Filter** envelope is inverted when the display reads **UCF**, Envelope 3 is inverted when the display reads **En3**, both Envelope 1 and 3 are inverted when the display reads **F-3**.

env 1 amnt

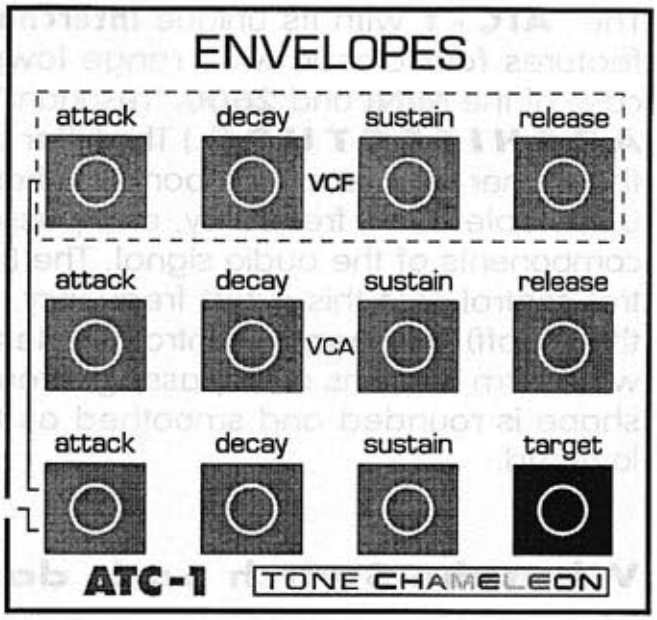
Selects **Envelope 1 amount**. The pattern of the filter envelope contouring is determined by the envelope controls - attack, decay, sustain, and release. The amount or depth of the envelope contouring is determined by this parameter.

env 3 amnt

Selects Envelope 3 amount. This is the amount of contour or depth of the envelope as it is applied to the selected target. See page 11.

ENVELOPES

ENVELOPE 1: VCF



The filter envelope shapes the timbre and overtone content of the audio signal as it passes through the modifying circuitry from the mixer. This envelope or "contour" generator is used to dynamically move the cutoff frequency . It works as such: each time a key is depressed an envelope or "contour" generator attached to the filter's cutoff frequency is actuated, and sends a control signal to the filter. The control signal rises at one rate, falls at a second rate, levels off at a certain level, and then finally falls off at a third rate. These four parameters and their effect upon the cutoff frequency are explained below.

What the Switch pads do:

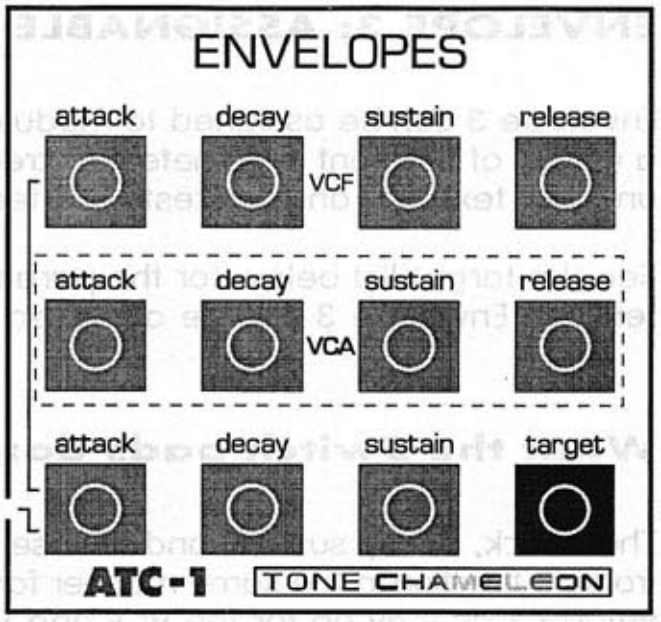
Selects the **attack** time. The attack time determines the initial segment of the envelope. (The frequency at which the contour begins is determined by the filter frequency setting, while the peak which it reaches is determined by the filter frequency and Envelope 1 amount settings combined. Incrementing the value from **0 - 127** will result in the brightness of the sound increasing sharply at first, and then more gradually as the attack time lengthens.

Selects the **decay** time. The decay time determines the duration of the second segment of the envelope, i.e., the fall from the attack peak to the sustain level. While repeatedly depressing a key and incrementing the value from **0 - 127** you will at first hear the brightness drop sharply after the initial attack; the drop will become more gradual as the decay time lengthens.

Selects the **sustain** level. The sustain level determines the filter frequency at which the envelope "levels off" after the initial rise and fall. The frequency of the sustain level can be as high as the initial peak, in which case there is no decay after the initial rise, or it can be as low as the frequency at which the envelope contour began.

Selects the **release** time. The fourth and final stage of the envelope contour. Finally, after the initial rise and fall of the attack and decay times to the sustain level; the release time takes effect **after** the sustain level segment, when the played key or note is lifted. The frequency at which the sustain level is at, falls to the initial filter cutoff frequency level at the rate set by the release time.

ENVELOPE 2: VCA



The volume of the audio signal which passes through the VCA envelope is contoured by the envelope controls.

Each time a key is pressed, the envelope or "contour" generator attached to the amplifier is actuated, and sends a control signal to the amplifier. Like the filter envelope control signal, the VCA envelope control signal is composed of the same four segments: initial rise, decay, sustain level, and release time. The volume of the note is shaped according to the settings of the envelope controls. These four parameters are shown below.

What the Switch pads do:

attack

Selects the attack time. The attack time determines the duration of the initial rise in volume to a peak. Notice the sound take on different qualities as you increase from a short sharp attack to a long slow crescendo.

decay

Selects the decay time. The decay time determines the duration of the drop in volume from the initial peak to the sustain level. Shorter decay times will promore percussive sounds; the longer times will begin to "open" up the sound.

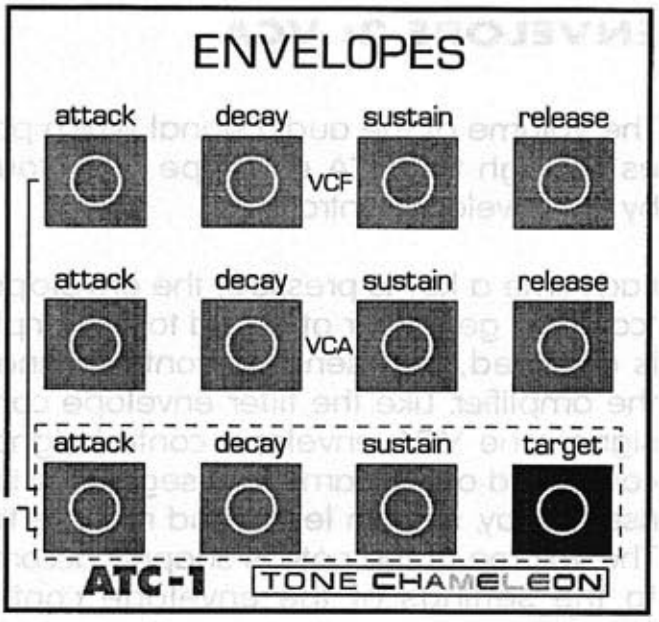
sustain

Selects the sustain level. The sustain level determines the volume level at which the envelope contour levels off after the attack and decay. Set at **0**, no sustain level is heard. Set at **50**, the contour diminishes to a low volume. Set at **127**, no drop in volume is heard after the initial peak is reached.

release

Selects the release time. The release allows the sound to fade out at the time set, rather than immediately upon release of a note or key. This "final decay" takes effect after the sustain level segment of the envelope.

ENVELOPE 3: ASSIGNABLE



Envelope 3 can be assigned to modulate a variety of different parameters to create unusual textures and interesting effects.

See the target list below for the parameters the Envelope 3 can be assigned to.

What the Switch pads do:

The attack, decay, sustain, and release controls all function in the same manner for Envelope 3 as they do for the VCF and VCA envelopes. When a key is struck the control signal modulates the assigned parameter's initial level to peak at the rate set by the **attack** time, the peak then drops to the sustain level at the **decay** rate, the sustain level remains until the note or key is lifted, then the **release**, if any, determines the rate at which the sustain level falls to the **initial** level.

NOTE: the release time of Envelope 3 is accesed by pressing the **decay** switch pad a second time. The first press gives you control of the decay time, the second press gives you control of the release time.

target

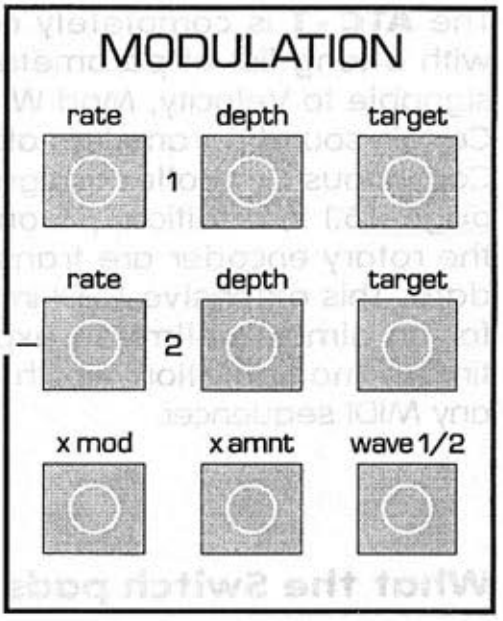
Selects Envelope 3 assignment list. Possible assignments:

OSCILLATOR 1 FREQUENCY	OSCILLATOR 1 PULSE WIDTH
OSCILLATOR 2 FREQUENCY	OSCILLATOR 2 PULSE WIDTH
OSCILLATOR 1 LEVEL	LFO 1 RATE
OSCILLATOR 2 LEVEL	LFO 1 DEPTH
XMOD LEVEL	LFO 2 RATE
NOISE LEVEL	LFO 2 DEPTH
FILTER RESONANCE	MAIN PITCH

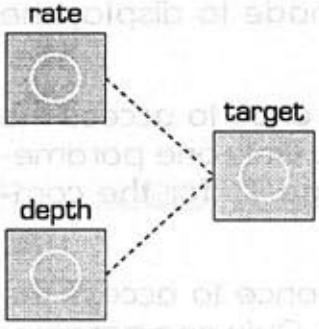
Refer to the "***MASTER SYMBOL KEY***" on the "**QUICK REFERENCE GUIDE**" sheet for explanations of the three digit abbreviations.

MODULATION

Modulation is the use of a control signal to create a repetitive pattern of pitch, level, or harmonic content changes. The shape of the modulation is determined by the waveform which the LFO outputs as selected by the **wave** switch pad. In addition to the four selectable waveshapes; sample & hold and noise provide random modulation. The amount of modulation is determined by either the depth control or any assigned MIDI controller. The **ATC-1**'s two Low Frequency Oscillators, or **LFO**'s are assignable to a variety of parameters, and **LFO 2** can be synchronized to MIDI time clock. (See ***PROGRAM***.) The **ATC-1** also has the capability of allowing Oscillator 2 to modulate Oscillator 1 and the frequency of the filter. This is known as Audio Frequency Modulation because the modulation control signal, in this case Oscillator 2, is in the audio spectrum.



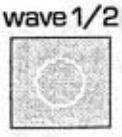
What the Switch pads do:



The switch pads for LFO 1 and 2 operate in the same manner; **rate** adjusting the frequency of the LFO, and **depth** attenuating the modulation signal. To select the sound source or parameter to be modulated by the LFO, press the **target** switch pad. See page 15 for LFO assignment list.

Selects the audio frequency modulation assignment - Oscillator 1, Filter frequency, or both. The frequency of Oscillator 1 is modulated by the audio ouput of Oscillator 2 when the display reads **OSC**. The frequency of the Filter is modulated by the audio output of Oscillator 2 when the display reads **VCF**; and both are modulated by Oscillator 2 when the display reads **O-F**.

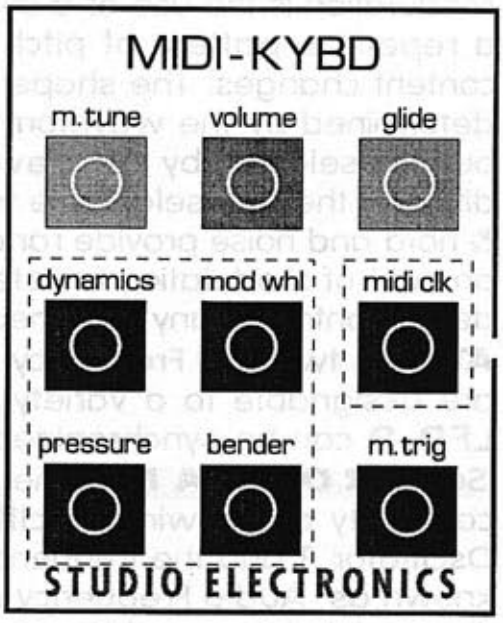
Selects the amount of Audio Frequency Modulation. Use this control in conjunction with Oscillator 2 frequency and mode 2 to create special effects.



Selects LFO 1 and 2 waveforms. Press once for LFO 1 waveform selection, press again for LFO 2 waveform selection. Continuous presses will toggle the LFO's. See the "**QUICK REFERENCE GUIDE**" sheet for waveform number definitions.

MIDI/KYBD

The **ATC-1** is completely controllable by MIDI, with a long list of parameters and functions assignable to Velocity, Mod Wheel, and Aftertouch. Certain sound parameters also have a dedicated Continuous Controller assignment. (See chart on page 16.) In addition, parameter edits made by the rotary encoder are transmitted as Controller data. This extensive MIDI implementation allows for an almost unlimited expression of tone and timbre manipulation which can be recorded to any MIDI sequencer.



What the Switch pads do:

dynamics

Selects the velocity sensitivity of Envelope amounts 1, 2, and 3. Press once to access Envelope 1, the display will read: **EA1**; to change the value, use the encoder - press again to access Envelope 2, the display will read: **EA2**; use the encoder to edit - pressing a third time accesses Envelope 3, the display will read: **EA3**; follow with the encoder to change the value. The manner in which this switch pad operates requires an edit to the patch to be made to display the current value of a parameter selected.

mod whl

Selects the Mod Wheel assignment and its sensitivity. Press once to access the assignment list, press again to access the sensitivity amount. Only one parameter at a time can be controlled by the Mod Wheel. (See page 16 for the complete assignment list.)

pressure

Selects the Aftertouch assignment and its sensitivity. Press once to access the assignment list, press again to access the sensitivity amount. Only one parameter at a time can be controlled by Aftertouch. Assignments for Aftertouch are the same as for the Mod Wheel.

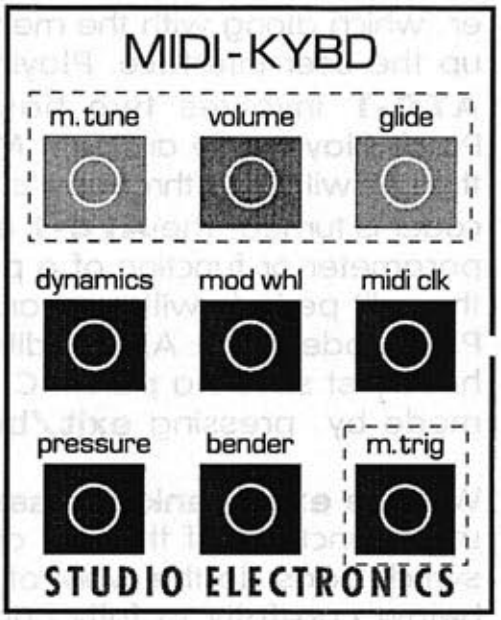
bender

Selects the Pitch Bend control range of the oscillators and the filter. Press once to access the oscillators, the display will read: **OSC** ; use the encoder to change the value - press again to access the filter, the display will read: **VCF**; use the encoder to edit. The manner in which this switch pad operates requires an edit to the patch to be made to display the current value of a parameter selected.

midi clk

Selects the MIDI clock assignment to LFO 2. The rate of LFO 2 can be synchronized to incoming MIDI time clock sent from your sequencer. The beat divisions available are: **1** = whole note, **2** = half note, **4** = quarter note, **4-3** = quarter note triplet, **8** = eighth note, **8-3** = eighth note triplet, **16** = sixteenth note, **16-3** = sixteenth note triplet. Note: LFO 2 rate control will not respond when a MIDI clock division is selected.

MIDI/KYBD continued



What the Switch pads do:

Selects the master tuning and overall transpose. Press once to access the master tune control which raises or lowers the pitch of the oscillators over a semitone range. Press again to access the overall octave transpose. The pitch can then be transposed up or down one octave.

Selects the master volume level. We recommend this level be set at maximum or close to it, for the best possible sound quality.

Selects the glide time and auto glide interval functions. Press once to access the glide time. Press again to access the auto glide interval. A third press will turn off glide and auto glide. **Glide** is pitch movement from note to note at a selected rate, and **Auto Glide** is pitch movement from a selected interval at a rate determined by the glide time. Note: If the auto glide interval is anything but **0**, the auto glide function will override glide.

Selects the key triggering and note priority functions. Press once to access single or multiple triggering selection. Press again to access note priority selection. **Multiple triggering** is the re-triggering of the filter envelope with each note or key stroke; with single triggering the filter envelope is re-triggered only with staccato notes or key strikes. **Note Priority** determines if while a holding note, any new note, or a lower note only, will be played next.

PROGRAM

Located in this section is the display and rotary encoder, which along with the membrane front panel, make up the user interface. Playing and programming the **ATC-1** involves two basic modes of operation: Patch Play Mode and Edit Mode. In Patch Play mode, the unit will cycle through it's 512 patches when the encoder is turned. The **ATC-1** enters Edit Mode when any parameter or function of a patch is selceted, at which the edit periods will appear. You are always in Patch Play Mode when: A) No editing has been done. B) You have just saved a patch. C) You have exited the edit mode by pressing **exit/bank**. D) Upon power up.

With the **exit/bank** and **save** switch pads, the basic utility functions of the unit are performed. These two switch pads do the work of six. Read the instructions below carefully to fully understand each operation.

To Save a patch: To save a sound to the patch memory, press **save** once; the display will flash the current patch number, pressing **save** again will record it to its current location; to save the sound to a new location, rotate the encoder to the desired number then press **save** again.

To Exit an edited patch: If at any time after editing a patch you wish to return to the Patch Number Display Mode, press the **exit/bank** switch pad.

To Compare an edited patch: After a patch has been edited, press and hold **exit/bank** then press save. You will then hear the un-edited originally saved patch, at this point no switch pad will be recognized, except for **exit/bank**; press this to get back to the edited patch. The display and encoder will return to the last edited parameter. Remembe,r a sound must first be edited to use this function.

To change the MIDI Channel: The MIDI channel can be changed only, before a patch has been edited. Press and hold **exit/bank**, then press **save**; the display will show the current MIDI channel - use the encoder to edit. This is the same procedure required to "edit/compare"; except that it must be performed prior to any patch editing.

To quickly change memory Bank: Once again this is done only before a patch has been edited. Press and hold **exit/bank** then rotate the encoder. The patch number will change in increments of 128 steps in either direction.

To initiate SYS EX bank dump: Press and hold **save**, then press **exit/bank.** Each bank is sent individually. To send a SYSEX dump of bank 1, set patch number to **1**; to send bank 2, set patch number to **129**; to send bank 3, set patch number to **257**; to send bank 4, set patch number to **385**.

LFO AND MIDI ASSIGNMENTS

LFO'S 1 AND 2

Osc 1&2 freq	Osc 1 mix	Osc 2 PW
VCF freq	Osc 1 PW	X mod amnt
VCF res	Osc 2 freq	Noise mix
Osc 1 freq	Osc 2 mix	Volume

DYNAMICS	MOD WHL / PRESSURE		BENDER
Env 1 amnt	VCF freq	X mod amnt	Osc 1&2 freq
Env 2 amnt	VCF res	Noise mix	VCF freq
Env 3 amnt	Osc 1 freq	LFO 1 rate	
	Osc 1 mix	LFO 1 depth	
	Osc 1 PW	LFO 2 rate	
	Osc 2 freq	LFO 2 depth	
	Osc 2 mix	ENV 1 amnt	
	Osc 2 PW	ENV 3 amnt	

ADDED CONTINUOUS CONTROLLER ASSIGNMENTS

54 Osc 1 freq	73 LFO 2 depth	107 Env 1 amnt
55 Osc 1 tri on / off	74 X mod amnt	108 Env 1 attack
56 Osc 1 saw on / off	84 Env 3 amnt	109 Env 1 decay
57 Osc 1 pul on / off	85 Env 3 attack	110 Env 1 sustain
58 Osc 1 pul width	86 Env 3 decay	111 Env 1 release
59 Osc 2 freq	87 Env 3 sustain	112
60 Osc 2 tri on / off	88 Env 3 release	114 Env 2 attack
61 Osc 2 saw on / off	89	115 Env 2 decay
62 Osc 2 pul on / off	102 Mix 1	116 Env 2 sustain
63 Osc 2 pul width	103 Mix 2	117 Env 2 release
70 LFO 1 rate	104 Mix noise	118
71 LFO 1 depth	105 VCF freq	119 303 accent macro
72 LFO 2 rate	106 VCF res	120

STANDARD CONTINUOUS CONTROLLER ASSIGNMENTS

Bank select**	5 Portamento	64 Sustain pedal
7 Volume	65 Porta on / off	All notes off

**To change banks, follow this procedure: send controller #0 with a value of 0 followed by controller #32 with a value of 0 for bank 1; a value of 1 for bank 2; a value of 2 for bank 3; a value 3 for bank 4. The next program change sent will go to the selected bank. Do not insert any other controller data into the bank change procedure.

Studio Electronics
ATC-1

MIDI Implementation Chart

Date : July 5 1996
Version : 1.00

Function***		Transmitted	Recognized	Remarks
Basic	Default	X	1 - 16	MEMORIZED
Channel	Changed	X	1 - 16	
Mode	Default	X	4	OMNI OFF, MONO
	Messages		X	
	Altered			
Note Number	True Voice	X	0 - 127	
Velocity	Note ON	X	09n, V = 127	
	Note OFF	X	X	
After Touch	Key's	X	O	
	Ch's	X	O	
Pitch Bend				
Control Change	*See chart page 16			
	Basic Channel			
Program Change	True #	X	0 - 127	
System Exclusive		O	O	
System Common	Song Pos	X	X	
	Song Sel	X	X	
	Tune	X	X	
System Real Time	Clock	X	O	
	Commands	X	X	
Aux Message	Local ON/OFF	X	O	
	All Notes OFF	X	O	
	Active Sense	X	X	
	Reset	X	X	
Notes				

Specifications

- Maximum voices: one
- Parameter resolution: 16 bit
- Display: 3 digit light emitting diodes
- Sound memory: internal RAM, 512 patches
- Frequency response: very low to dog bothering
- Residual noise level: really quiet
- Total harmonic distortion: not much, but just enough
- External dimensions: 19" x 10" x 3 1/2" (2 rack spaces)
- Output: -15 dbm
- Power supply: AC 90 - 250 VAC (50/60hz) auto switching
- Weight: 8lbs of expertly designed well wrought genius
- CV out: 0 - 10 volts / Gate out: 10 volt positive V-trigger

Trouble Shooting

No sound

1. Are the connections correct?
2. Is the filter cartridge properly inserted?
3. Is the volume of the ATC - 1 turned up?
4. Are the MIDI channel settings correct?

The pitch is wrong

1. Is the master tuning setting correct?
2. Are the octave transpose, coarse tuning/fine tuning settings correct?

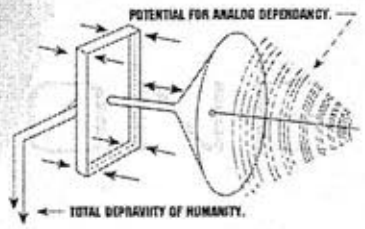
Accidentally turned the power off while editing

Unsaved patch edits will be lost.

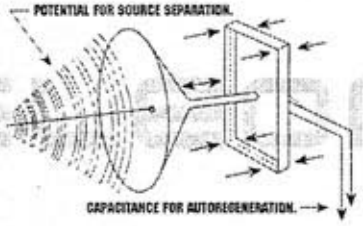
Note is stuck on

Although the ATC-1 has been thoroughly tested for potential software bugs, we cannot simulate all possible user setups. So in some instances, the ATC-1 may "lock up" or "stick" on a note. To rectify this situation, try one or more of the following:
1. Play and hold more than 8 notes.
2. Send an (all notes off) command from your sequencer.
3. If all the aforementioned measures fail, turn the unit off, and then on.

ANALOG TONE CHAMELEON -1 QUICK REFERENCE GUIDE



STUDIO ELECTRONICS
SINCE 1985
PREMIUM QUALITY ANALOG



All ATC -1 parameters are accessed via the membrane front panel. To change a value, simply press the corresponding membrane button; the L.E.D. will display the current value. Moving the knob in either direction will modify selection.

The following buttons have dual/multiple functions:

BUTTON	1ST PRESS	2ND PRESS	3RD PRESS
m. tune	master tuning	overall transpose	
glide (if off)	glide status	glide time	auto-glide interval
glide (if on)	glide time	auto-glide interval	glide off
dynamics	velocity sens. of env 1 *	velocity sens. of env 2 *	velocity sens. of env 3 *
mod whl	destination	amount	
pressure	destination	amount	
bender	pitch bend interval *	VCF frequency control *	
m. trig	multiple triggering / on, off	note priority / low, last	
wave	LFO 1 waveform *	LFO 2 waveform *	
freq / tune	(OSC 2) coarse tune	fine tune	
env 3 decay	decay time	release time	

LFO WAVE KEY
1. TRIANGLE
2. SQUARE
3. SAWTOOTH
4. REVERSE SAW.
5. NOISE
6. RANDOM

* Use encoder to edit.

To access MIDI channel. Press and hold exit/bank, then press save. Use encoder to edit.
To jump from bank to bank: Hold exit/bank, rotate encoder. Shifts in increments of 128.
To edit compare: Press and hold exit/bank, then press save. (After an edit has been performed.)
To save patch info: Press and hold save, then press exit/bank. (System exclusive info.)

KEY

MASTER			SYMBOL			SYMBOL
VOL	MAIN VOLUME	O1F	OSC 1 FREQUENCY	nSE	NOISE LEVEL	
L1r	LFO 1 RATE	O1P	OSC 1 PULSE	VCF	FILTER FREQUENCY	
L1d	LFO 1 DEPTH	O1L	OSC 1 LEVEL	rES	FILTER RESONANCE	
L2r	LFO 2 RATE	O2F	OSC 2 FREQUENCY	E1A	ENV. 1 AMOUNT	
L2d	LFO 2 DEPTH	O2P	OSC 2 PULSE	E2A	ENV. 2 AMOUNT	
XMS	X MOD AMOUNT	O2L	OSC 2 LEVEL	E3A	ENV. 3 AMOUNT	

TYPE:

#01 Yeah
#02 Tongue Depressant
#03 Guide Vocal
#04 I Spilled
#05 Dig Dig Dig
#06 Analogia
#07 Black Bubble
#08 Brownout
#09 Decision '96
#10 Cavaliering
#11 Beautiful Dreamer
#12 Proper Hours
#13 Dependence Day
#14 Deconzo's Garden
#15 G.J. Rack The House
#16 Warren's Report
#17 Closet Quarrel
#18 No Barkin' Doggie
#19 Used Tubes
#20 Nasty Tubes
#21 Wood Den
#22 Hurry Home
#23 Hurry Home #2
#24 Dependable Scandal
#25 Persistence
#26 Crafty Tool
#27 The Other Marc
#28 Sample & Hold Me
#29 Crandle Cradle
#30 Crandle Cradle #2
#31 Bottom Line
#32 Release Him !
#33 Standing Room Only
#34 Permanent Buss
#35 Supple Movement
#36 Belly-Button
#37 Little John
#38 Dark Corridor
#39 Sine Here
#40 Sticky #9
#41 Immortal Clav
#42 Immortal Clav #2
#43 Immortal Clav #3
#44 The Other Ambrose
#45 Psyche Check
#46 Sweet Solitude
#47 Dialogo
#48 Easy Choice
#49 Easy Choice #2
#50 Long Reply
#51 Sisiphus' Burden
#52 Le Bottommy
#53 Spongi
#54 Resonance Flavor
#55 Thoughtful Time
#56 Mibo
#57 Regal Snaps
#58 Locke Heed
#59 Prodigal Son
#60 They're Back
#61 Yeah We're Back
#62 B.W. Yo-yo
#63 Jacob's Ladder
#64 Neighbor Girl
#65 The Older Sister
#66 The Mommy
#67 Cross Mod
#68 Glad You Did
#69 Keith's Idea
#70 Keith's Idea #2
#71 Emily
#72 Whippoorwill
#73 Reluctant Kitten
#74 Mode 3
#75 Darker Sierra's
#76 82 & Cloudy
#77 Over-Classed
#78 Fine Brandy
#79 Fine Brandy #2
#80 Synthetic Reality
#81 Do U Know Me ?
#82 Mystery Set
#83 Preternatural Funk
#84 Preternatural Funk #2
#85 Sky Blue
#86 Marin
#87 Apple Shade
#88 Nozlar
#89 Andromeda's Train
#90 Without Recourse
#91 J.D. Freedom 1
#92 J.D. Freedom 2
#93 J.D. Freedom 3
#94 Stevie's Crunch
#95 Too There
#96 Too There Too
#97 Bandonthe...
#98 Pulsar Series
#99
#100
#101
#102
#103
#104
#105
#106
#107
#108 Cygnus Cried
#109 Phadra's Duughter
#110 Water Toaster
#111 What's Left
#112 T. Care My Peeps
#113 Wonariahowa
#114 Black Helicopters
#115 Ridelin Mess
#116 Floyd Port
#117 Vearhovin's Seminar
#118 Roswell Trash
#119 Thorey's Timp
#120 Thorey's Timp 2
#121 Revelation Worm
#122 Synthclap
#123 Synthclap 2
#124 Synthclap 3
#125 With His Saints
#126 Deiter's Monkey
#127 Voltair's Lair
#128 Cerberes' Welcome

MINI

TYPE:

#129 London Monster
#130 London Monster 2
#131 London Monster 3
#132 Pleasure Shock
#133 Sand Tracing
#134 Phat Formula
#135 Barren Von Mortal
#136 Smoothery
#137 Smootherize
#138 Ad Mysterium
#139 Sample & Mold
#140 Rhythm Swept
#141 Sinestre
#142 Dream Drop-off
#143 Eternal Time
#144 Torn Planet
#145 All One Bass
#146 All One Bass 2
#147 Sneekin' Steps
#148 Psychofurious
#149 Psychocurious
#150 Careful Selection
#151 Perfect 4 E-7
#152 All That Phat
#153 All That Phat 2
#154 Classy Overbite
#155 In The Key Of Nate
#156 Sullenor
#157 Sullenest
#158 Subtle Teas
#159 No More Honey
#160 Last Day
#161 Wangrier
#162 Tradition of The F.
#163 Elevated Pulse
#164 Roomshaker
#165 Roomshaker 2
#166 Surprisingly Strong
#167 Meedlemose
#168 Decent Guy
#169 Daily Delay
#170 Delay Of Game
#171 Ask Patrick
#172 No Brushes
#173 Warmesque
#174 Pleasant Rise
#175 Pleasant Rise 2
#176 Thud Character
#177 12 DB Stevie 2
#178 12 DB Stevie 3
#179 Imperkanant
#180 Mod Wah Me
#181 Ultimatum
#182 Just Ask Her
#183 One Later
#184 Pointy Tub
#185 Soldupulted
#186 "There" Truth
#187 Seldom Seen
#188 All Waves
#189 All Waves 2
#190 Le Bottomy
#191 Greg's Basic
#192 Life's Been Good
#193 Slapdragon
#194 Without Question
#195 Classic Z.
#196 Classic Z. 2
#197 Droney
#198 Stunned Phasor
#199 Stunned Phasor 2
#200 Stunned Phasor 3
#201 Still Useful In...
#202 Still Useful In... 2
#203 Ironic
#204 Sitar Effect
#205 Sitar Effect 2
#206 Requiring thought
#207 Intervalley
#208 Legendary High's
#209 Old Schoolin'
#210 Neumanic
#211 Worm Colour
#212 Worm Colour 2
#213 Worm Colour 3
#214 Worm Colour 4
#215 Elka Times
#216 Elka Times 2
#217 Muted Reaction
#218 Tricky Mix
#219 Not To Tight
#220 Ty Fry
#221 Playful Mood
#222 Playful Mood 2
#223 Residue
#224 The 80's & After T.
#225 Vibrathon
#226 CS-80 Alert
#227 X-mod Files
#228 X-mod Files 2
#229 X-mod Files 3
#230 X-mod Files 4
#231 X-mod Files 5
#232 Friendly Pulsar
#233 Friendly Pulsar 2
#234 Friendly Pulsar 3
#235 More Of It
#236 More Of It 2
#237 More Of It 3
#238 Humpti
#239 Humpti 2
#240 Angziote
#241 Aww
#242 Oh Well/No
#243 Eeeooww
#244 Look At It
#245 All Yours
#246 No Tickles !
#247 Personal Trainers
#248 O.K. Echo
#249 O.K. Echo 2
#250 O.K. Echo 2
#251 Percy
#252 Percy 2
#253 Wider One
#254 Moley
#255 Quiet Error
#256 No Major Changes

S.E.M.

TYPE:

#257 Baselined
#258 Pulsing
#259 Old Filtered
#260 I Saw You
#261 Self Addressed Env.
#262 Rumble in the Box
#263 Secondhand Circuit
#264 Silver Lining
#265 Twiddler on the Roof
#266 My Cup Runneth Over
#267 Bubbleviscious
#268 To 3 Or Not 0 3
#269 Cheese Grater
#270 Spring Time
#271 Modulator Receptacle
#272 Non Rezidence
#273 Round About
#274 Muffled Silence
#275 Face of the Deep
#276 Fever Pitch
#277 Canned Analog
#278 Cosmic Love Joy
#279 Filter Cleaner
#280 Warm Welcome
#281 Chunky Style
#282 System Optimum
#283 West Swell
#284 Positive Vorticity
#285 Quest
#286 Ruptured Vessel
#287 Synchro Thinchro
#288 Terminal Velocity
#289 Pool Acid
#290 Tripping Over Cans
#291 System Reclusive
#292 Deceptively Quiet
#293 Mumble Abode
#294 Circular Logic
#295 Systematizer
#296 Turn Off the Ringer
#297 Dead Ringer
#298 Ionosphere
#299 Strings with Rings
#300 End of the Age
#301 Underground Railroad
#302 Entropy
#303 In the Beginning . . .
#304 Juggernaut
#305 Cyclone
#306 Inflow Jet
#307 Suspense
#308 AXXE
#309 Phase Synced
#310 Synth Punch
#311 Electron Discharge
#312 Cutoff Joy
#313 Push the Envelope
#314 Bouncer
#315 Rez Rider
#316 Freestyle
#317 Too Bad
#318 Hard Move
#319 Silver Box Chorus
#320 Slow Beater
#321 150 Ways
#322 Plead the 5th
#323 The 5th Day
#324 Level 5
#325 Hesitant 5th Grader
#326 Quintuplets
#327 Day of Rest
#328 Sequence Trigger
#329 Skip Away
#330 LFOllower
#331 7 days
#332 Tune Me In
#333 Orderly Chaos
#334 Mesocyclone
#335 Smoking Circuit Board
#336 Cross My Heart
#337 Nasal Academy
#338 Pick Up Your Cross
#339 Falling Far
#340 Risen
#341 Defcon 1
#342 Synth Valley
#343 Flutterbox
#344 Dark House
#345 Analog Sequencer
#346 Slightly Wavering
#347 8 Steps
#348 4th of July
#349 Harmonius
#350 Locked In
#351 Fast Forward in Paris
#352 Emerson's Overture
#353 Fickle Sync
#354 Over Driven
#355 Forced Cycle
#356 Synced Arpeggiation
#357 Descending Wave
#358 Data Processor
#359 Risk Factor
#360 Distant Thunder
#361 Horizon
#362 Drop Kick
#363 Rez Kick
#364 Rotterbam
#365 Noise Snare
#366 Flat Snare
#367 Rise and Fall
#368 Pitch Dropper
#369 Wump Bass
#370 Touchy 808
#371 Sine of the Times
#372 Hollow Ring
#373 Full Modulation
#374 Skillet Bell
#375 Non Listener
#376 Transceiver
#377 Tower of Babel
#378 Can't Beat It
#379 Saw that Bass
#380 Funkaswellic
#381 Wheel and Deal
#382 Could It Be
#383 Klaus
#384 Slide and Abide

303